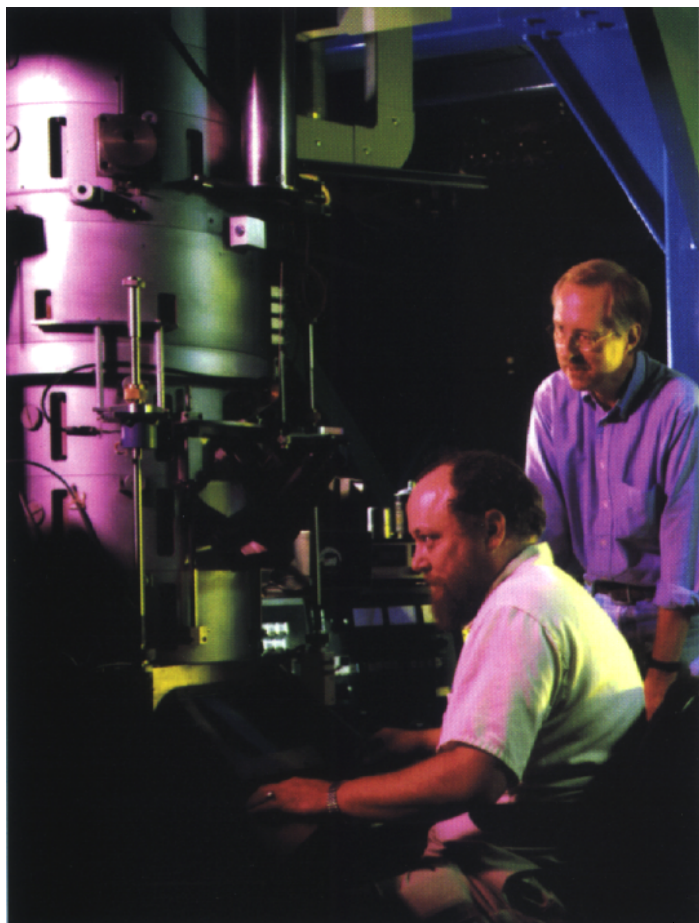


NATIONAL CENTER FOR ELECTRON MICROSCOPY



The National Center for Electron Microscopy (NCEM) at Lawrence Berkeley National Laboratory is one of the nation's primary research facilities for the use of high-voltage electron microscopes in the examination of atomic structure of materials.

Of the two high-voltage microscopes, one operates at 1.5 million volts, making it the highest voltage electron microscope in the United States. Its in situ capability allows specimens to be examined while undergoing tensile testing, or while being heated in reducing or oxidizing gases. It is available on-line for remote users.

The second instrument, the Atomic Resolution Microscope, operates at 400,000 volts to one million volts and has a point-to-point resolution of 0.16 nanometers – the highest in the United

A development team tests the computer system that has enabled the National Center for Electron Microscopy's 1.5 million-electron-volt high-voltage electron microscope to be used remotely (via the Internet) for in situ experiments by widely-separated collaborators.

States. It can distinguish individual atoms in many materials.

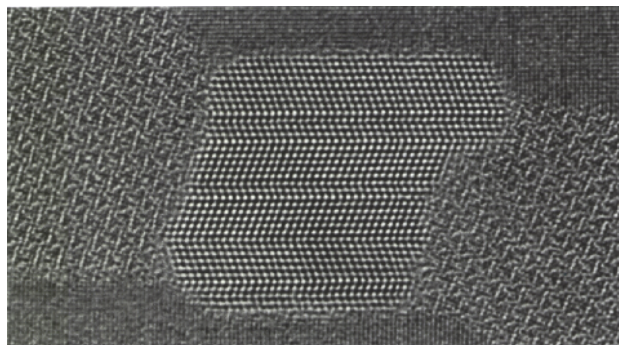
Five additional microscopes operate at 200,000 volts. One has in situ capability allowing the specimen to be examined while being changed by electrical currents, heating, or chemical etching.

ACCOMPLISHMENTS

Hewlett-Packard's study of defect structures in semiconductors revealed new information on mechanisms by which VLSI memory circuits fail.

Future compact disc players could be improved by IBM Almaden studies of the microstructural properties of multilayer thin films for phase-change optical recording.

NASA/Ames and NCEM researchers determined the structure of minute diamond particles from outer space, using a combination of electron energy loss spectroscopy, high-resolution electron microscopy, and microdiffraction.



Ultra-high-resolution electron micrograph of a lightweight piston ring alloy, taken on the NCEM ARM, showing a precipitate of twinned silicon (center) and a complex Al-Si-Cu-Mg phase in the aluminum matrix (from a collaboration with GM).